

SEQUENCE SUBMISSION

SEQ ID NO: 1 provides primate IL-1 ζ nucleotide sequence.
SEQ ID NO: 2 provides primate IL-1 ζ polypeptide sequence.
5 SEQ ID NO: 3 provides primate IL-1 ζ variant nucleotide sequence.
SEQ ID NO: 4 provides primate IL-1 ζ variant polypeptide sequence.
SEQ ID NO: 5 provides primate IL-1 α polypeptide sequence.
SEQ ID NO: 6 provides rodent IL-1 α polypeptide sequence.
SEQ ID NO: 7 provides primate IL-1 γ polypeptide sequence.
10 SEQ ID NO: 8 provides rodent IL-1 γ polypeptide sequence.
SEQ ID NO: 9 provides primate IL-1 β polypeptide sequence.
SEQ ID NO: 10 provides rodent IL-1 β polypeptide sequence.
SEQ ID NO: 11 provides primate IL-1RA polypeptide sequence.
SEQ ID NO: 12 provides rodent IL-1RA polypeptide sequence.
15 SEQ ID NO: 13 provides rodent IL-1 δ polypeptide sequence.
SEQ ID NO: 14 provides rodent IL-1 ϵ polypeptide sequence.
SEQ ID NO: 15 provides primate IL-1 ϵ polypeptide sequence.

20 (1) GENERAL INFORMATION:

(i) APPLICANT: Timans, Jacqueline C.

25 (ii) TITLE OF INVENTION: Mammalian Cytokines; Related Reagents and
Methods

(iii) NUMBER OF SEQUENCES: 15

30 (iv) CORRESPONDENCE ADDRESS:

- (A) ADDRESSEE: DNAX Research Institute
- (B) STREET: 901 California Avenue
- (C) CITY: Palo Alto
- (D) STATE: California
- (E) COUNTRY: USA
- (F) ZIP: 94304-1104

35 (v) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk
- (B) COMPUTER: Apple Macintosh
- (C) OPERATING SYSTEM: Macintosh 8.5.1
- (D) SOFTWARE: Microsoft Word

40 (vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER:
- (B) FILING DATE:
- (C) CLASSIFICATION:

45 (viii) ATTORNEY/AGENT INFORMATION:

- (A) NAME: Ching, Edwin P.
- (B) REGISTRATION NUMBER: 34,090
- (C) REFERENCE/DOCKET NUMBER: DX0904K

50 (ix) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: (650)852-9196
- (B) TELEFAX: (650)496-1200

60 (2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1225 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

5

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- 10 (A) NAME/KEY: CDS
 (B) LOCATION: 491..1144

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

| | | |
|----|---|-----|
| 15 | CGGTTTGT TTCTTAGAGA TTTTACAGTG TTGGTTATAA TTGTGCAC TT AATCTTTATT | 60 |
| | TTCCTTATAC AGTAGTCCCC CCGATCAACT GGGGGCATGT TCCATACCCC TGGTGGATTC | 120 |
| 20 | CTGAAACTGC CAGTTAGTAC CAAACCCTAT ATAGATTGTG TTTTTTCCTG TACGCAGGCC | 180 |
| | GACACACAGG AAATCATAAG TCAGGAGGGC CACTGCCACG CAGGAAAGAC CCATCTGAAC | 240 |
| 25 | TGCTGCAAAA GCTCCGTGTC GATTTATTGC TTCCACAAAT AGTGCCGATA TGCACCAGGC | 300 |
| | ACTGTTGTAA AACTGAAAAT ATGTTTTGGG ATGTGCCAG TCTACCTAGC TCCTTCAAGT | 360 |
| | AAAGGATCCT GAGAACTGAA GGCAACAGA GCTCCAGGAG TCCAAGACAG AGCCACACAC | 420 |
| 30 | CACGAGGATC CTGGCCCAGG TCTTGGACTT CCATTCCAT TTCTGTTGAG TAATAAACTC | 480 |
| | AACGTTGAAA ATG TCC TTT GTG GGG GAG AAC TCA GGA GTG AAA ATG GGC | 529 |
| | Met Ser Phe Val Gly Glu Asn Ser Gly Val Lys Met Gly | |
| | 1 5 10 | |
| 35 | TCT GAG GAC TGG GAA AAA GAT GAA CCC CAG TGC TGC TTA GAA GAC CCG | 577 |
| | Ser Glu Asp Trp Glu Lys Asp Glu Pro Gln Cys Cys Leu Glu Asp Pro | |
| | 15 20 25 | |
| 40 | GCT GGA AGC CCC CTG GAA CCA GGC CCA AGC CTC CCC ACC ATG AAT TTT | 625 |
| | Ala Gly Ser Pro Leu Glu Pro Gly Pro Ser Leu Pro Thr Met Asn Phe | |
| | 30 35 40 45 | |
| 45 | GTT CAC ACA AGT CGA AAG GTG AAG AGC TTA AAC CCG AAG AAA TTC AGC | 673 |
| | Val His Thr Ser Arg Lys Val Lys Ser Leu Asn Pro Lys Lys Phe Ser | |
| | 50 55 60 | |
| 50 | ATT CAT GAC CAG GAT CAC AAA GTA CTG GTC CTG GAC TCT GGG AAT CTC | 721 |
| | Ile His Asp Gln Asp His Lys Val Leu Val Leu Asp Ser Gly Asn Leu | |
| | 65 70 75 | |
| | ATA GCA GTT CCA GAT AAA AAC TAC ATA CGC CCA GAG ATC TTC TTT GCA | 769 |
| | Ile Ala Val Pro Asp Lys Asn Tyr Ile Arg Pro Glu Ile Phe Phe Ala | |
| | 80 85 90 | |
| 55 | TTA GCC TCA TCC TTG AGC TCA GCC TCT GCG GAG AAA GGA AGT CTG ATT | 817 |
| | Leu Ala Ser Ser Leu Ser Ser Ala Ser Ala Glu Lys Gly Ser Leu Ile | |
| | 95 100 105 | |

TIMANS

104

DX0904K

(2) INFORMATION FOR SEQ ID NO:2:

35

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 218 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

40

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

45 Met Ser Phe Val Gly Glu Asn Ser Gly Val Lys Met Gly Ser Glu Asp
1 5 10 15

Trp Glu Lys Asp Glu Pro Gln Cys Cys Leu Glu Asp Pro Ala Gly Ser
20 . 25 . 30

50 Pro Leu Glu Pro Gly Pro Ser Leu Pro Thr Met Asn Phe Val His Thr
35 40 45

55 Ser Arg Lys Val Lys Ser Leu Asn Pro Lys Lys Phe Ser Ile His Asp
55 50 55 60

Gln Asp His Lys Val Leu Val Leu Asp Ser Gly Asn Leu Ile Ala Val
65 70 75 80

TIMANS

105

DX0904K

Pro Asp Lys Asn Tyr Ile Arg Pro Glu Ile Phe Phe Ala Leu Ala Ser
 85 90 95

Ser Leu Ser Ser Ala Ser Ala Glu Lys Gly Ser Leu Ile Leu Leu Gly
 5 100 105 110

Val Ser Lys Gly Glu Phe Cys Leu Tyr Cys Asp Lys Asp Lys Gly Gln
 115 120 125

10 Ser His Pro Ser Leu Gln Leu Lys Lys Glu Lys Leu Met Lys Leu Ala
 130 135 140

Ala Gln Lys Glu Ser Ala Arg Arg Pro Phe Ile Phe Tyr Arg Ala Gln
 145 150 155 160

15 Val Gly Ser Arg Asn Met Leu Glu Ser Ala Ala His Pro Gly Trp Phe
 165 170 175

Ile Cys Thr Ser Cys Asn Cys Asn Glu Pro Val Gly Val Thr Asp Lys
 20 180 185 190

Phe Glu Asn Arg Lys His Ile Glu Phe Ser Phe Gln Pro Val Cys Lys
 195 200 205

25 Ala Glu Met Ser Pro Ser Glu Val Ser Asp
 210 215

(2) INFORMATION FOR SEQ ID NO:3:

30 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 657 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: cDNA

40 (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 1..654

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

ATG TCC TTT GTG GGG GAG AAC TCA GGA GTG AAA ATG GGC TCT GAG GAC 48
 Met Ser Phe Val Gly Glu Asn Ser Gly Val Lys Met Gly Ser Glu Asp
 1 5 10 15

50 TGG GAA AAA GAT GAA CCC CAG TGC TGC TTA GAA GAC CCG GCT GTA AGC 96
 Trp Glu Lys Asp Glu Pro Gln Cys Cys Leu Glu Asp Pro Ala Val Ser
 20 25 30

55 CCC CTG GAA CCA GGC CCA AGC CTC CCC GCC ATG AAT TTT GTT CAC ACA 144
 Pro Leu Glu Pro Gly Pro Ser Leu Pro Ala Met Asn Phe Val His Thr
 35 40 45

60 AGT CCA AAG GTG AAG AAC TTA AAC CCG AAG AAA TTC AGC ATT CAT GAC 192
 Ser Pro Lys Val Lys Asn Leu Asn Pro Lys Lys Phe Ser Ile His Asp
 50 55 60

TIMANS

106

DX0904K

| | | |
|----|---|-----|
| | CAG GAT CAC AAA GTA CTG GTC CTG GAC TCT GGG AAT CTC ATA GCA GTT Gln Asp His Lys Val Leu Val Leu Asp Ser Gly Asn Leu Ile Ala Val 65 70 75 80 | 240 |
| 5 | CCA GAT AAA AAC TAC ATA CGC CCA GAG ATC TTC TTT GCA TTA GCC TCA Pro Asp Lys Asn Tyr Ile Arg Pro Glu Ile Phe Phe Ala Leu Ala Ser 85 90 95 | 288 |
| 10 | TCC TTG AGC TCA GCC TCT GCG GAG AAA GGA AGT CCG ATT CTC CTG GGG Ser Leu Ser Ser Ala Ser Ala Glu Lys Gly Ser Pro Ile Leu Leu Gly 100 105 110 | 336 |
| 15 | GTC TCT AAA GGG GAG TTT TGT CTC TAC TGT GAC AAG GAT AAA GGA CAA Val Ser Lys Gly Glu Phe Cys Leu Tyr Cys Asp Lys Asp Lys Gly Gln 115 120 125 | 384 |
| 20 | AGT CAT CCA TCC CTT CAG CTG AAG AAG GAG AAA CTG ATG AAG CTG GCT Ser His Pro Ser Leu Gln Leu Lys Lys Glu Lys Leu Met Lys Leu Ala 130 135 140 | 432 |
| 25 | GCC CAA AAG GAA TCA GCA CGC CGG CCC TTC ATC TTT TAT AGG GCT CAG Ala Gln Lys Glu Ser Ala Arg Arg Pro Phe Ile Phe Tyr Arg Ala Gln 145 150 155 160 | 480 |
| 30 | GTG GGC TCC TGG AAC ATG CTG GAG TCG GCG GCT CAC CCC GGA TGG TTC Val Gly Ser Trp Asn Met Leu Glu Ser Ala Ala His Pro Gly Trp Phe 165 170 175 | 528 |
| 35 | ATC TGC ACC TCC TGC AAT TGT AAT GAG CCT GTT GGG GTG ACA GAT AAA Ile Cys Thr Ser Cys Asn Cys Asn Glu Pro Val Gly Val Thr Asp Lys 180 185 190 | 576 |
| 40 | TTT GAG AAC AGG AAA CAC ATT GAA TTT TCA TTT CAA CCA GTT TGC AAA Phe Glu Asn Arg Lys His Ile Glu Phe Ser Phe Gln Pro Val Cys Lys 195 200 205 | 624 |
| | GCT GAA ATG AGC CCC AGT GAG GTC AGC GAT TAG Ala Glu Met Ser Pro Ser Glu Val Ser Asp 210 215 | 657 |

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- 45 (A) LENGTH: 218 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

50

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ser | Phe | Val | Gly | Glu | Asn | Ser | Gly | Val | Lys | Met | Gly | Ser | Glu | Asp |
| 1 | | | | 5 | | | | | | 10 | | | | 15 | |
| Trp | Glu | Lys | Asp | Glu | Pro | Gln | Cys | Cys | Leu | Glu | Asp | Pro | Ala | Val | Ser |
| | | | 20 | | | | 25 | | | | | | 30 | | |

TIMANS

107

DX0904K

Pro Leu Glu Pro Gly Pro Ser Leu Pro Ala Met Asn Phe Val His Thr
35 40 45

5 Ser Pro Lys Val Lys Asn Leu Asn Pro Lys Lys Phe Ser Ile His Asp
50 55 60

Gln Asp His Lys Val Leu Val Leu Asp Ser Gly Asn Leu Ile Ala Val
65 70 75 80

10 Pro Asp Lys Asn Tyr Ile Arg Pro Glu Ile Phe Phe Ala Leu Ala Ser
85 90 95

Ser Leu Ser Ser Ala Ser Ala Glu Lys Gly Ser Pro Ile Leu Leu Gly
100 105 110

15 Val Ser Lys Gly Glu Phe Cys Leu Tyr Cys Asp Lys Asp Lys Gly Gln
115 120 125

Ser His Pro Ser Leu Gln Leu Lys Lys Glu Lys Leu Met Lys Leu Ala
20 130 135 140

Ala Gln Lys Glu Ser Ala Arg Arg Pro Phe Ile Phe Tyr Arg Ala Gln
145 150 155 160

25 Val Gly Ser Trp Asn Met Leu Glu Ser Ala Ala His Pro Gly Trp Phe
165 170 175

Ile Cys Thr Ser Cys Asn Cys Asn Glu Pro Val Gly Val Thr Asp Lys
180 185 190

30 Phe Glu Asn Arg Lys His Ile Glu Phe Ser Phe Gln Pro Val Cys Lys
195 200 205

35 Ala Glu Met Ser Pro Ser Glu Val Ser Asp
210 215

(2) INFORMATION FOR SEQ ID NO:5:

- 40 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 159 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear
- 45 (ii) MOLECULE TYPE: peptide

50 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Ser Ala Pro Phe Ser Phe Leu Ser Asn Val Lys Tyr Asn Phe Met Arg
1 5 10 15

55 Ile Ile Lys Tyr Glu Phe Ile Leu Asn Asp Ala Leu Asn Gln Ser Ile
20 25 30

Ile Arg Ala Asn Asp Gln Tyr Leu Thr Ala Ala Leu His Asn Leu
35 40 45

60

TIMANS

108

DX0904K

Asp Glu Ala Val Lys Phe Asp Met Gly Ala Tyr Lys Ser Ser Lys Asp
50 55 60

5 Asp Ala Lys Ile Thr Val Ile Leu Arg Ile Ser Lys Thr Gln Leu Tyr
65 70 75 80

Val Thr Ala Gln Asp Glu Asp Gln Pro Val Leu Leu Lys Glu Met Pro
85 90 95

10 Glu Ile Pro Lys Thr Ile Thr Gly Ser Glu Thr Asn Leu Leu Phe Phe
100 105 110

Trp Glu Thr His Gly Thr Lys Asn Tyr Phe Thr Ser Val Ala His Pro
115 120 125

15 Asn Leu Phe Ile Ala Thr Lys Gln Asp Tyr Trp Val Cys Leu Ala Gly
130 135 140

Gly Pro Pro Ser Ile Thr Asp Phe Gln Ile Leu Glu Asn Gln Ala
20 145 150 155

(2) INFORMATION FOR SEQ ID NO:6:

- 25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 156 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear
- 30 (ii) MOLECULE TYPE: peptide

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Ser Ala Pro Tyr Thr Tyr Gln Ser Asp Leu Arg Tyr Lys Leu Met Lys
1 5 10 15

40 Leu Val Arg Gln Lys Phe Val Met Asn Asp Ser Leu Asn Gln Thr Ile
20 25 30

Tyr Gln Asp Val Asp Lys His Tyr Leu Ser Thr Thr Trp Leu Asn Asp
45 35 40 45

Leu Gln Gln Glu Val Lys Phe Asp Met Tyr Ala Tyr Ser Ser Gly Gly
50 55 60

Asp Asp Ser Lys Tyr Pro Val Thr Leu Lys Ile Ser Asp Ser Gln Leu
50 65 70 75 80

Phe Val Ser Ala Gln Gly Glu Asp Gln Pro Val Leu Leu Lys Glu Leu
85 90 95

55 Pro Glu Thr Pro Lys Leu Ile Thr Gly Ser Glu Thr Asp Leu Ile Phe
100 105 110

Phe Trp Lys Ser Ile Asn Ser Lys Asn Tyr Phe Thr Ser Ala Ala Tyr
60 115 120 125

TIMANS

109

DX0904K

Pro Glu Leu Phe Ile Ala Thr Lys Glu Gln Ser Arg Val His Leu Ala
130 135 140

5 Arg Gly Leu Pro Ser Met Thr Asp Phe Gln Ile Ser
145 150 155

(2) INFORMATION FOR SEQ ID NO:7:

- 10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 158 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: peptide

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Asp Tyr Phe Gly Lys Leu Glu Ser Lys Leu Ser Val Ile Arg Asn Leu
1 5 10 15

25 Asn Asp Gln Val Leu Phe Ile Asp Gln Gly Asn Arg Pro Leu Phe Glu
20 25 30

Asp Met Thr Asp Ser Asp Cys Arg Asp Asn Ala Pro Arg Thr Ile Phe
35 40 45

30 Ile Ile Ser Met Tyr Lys Asp Ser Gln Pro Arg Gly Met Ala Val Thr
50 55 60

35 Ile Ser Val Lys Cys Glu Lys Ile Ser Thr Leu Ser Cys Glu Asn Lys
65 70 75 80

Ile Ile Ser Phe Lys Glu Met Asn Pro Pro Asp Asn Ile Lys Asp Thr
85 90 95

40 Lys Ser Asp Ile Ile Phe Phe Gln Arg Ser Val Pro Gly His Asp Asn
100 105 110

45 Lys Met Gln Phe Glu Ser Ser Tyr Glu Gly Tyr Phe Leu Ala Cys
115 120 125

Glu Lys Glu Arg Asp Leu Phe Lys Leu Ile Leu Lys Lys Glu Asp Glu
130 135 140

50 Leu Gly Asp Arg Ser Ile Met Phe Thr Val Gln Asn Glu Asp
145 150 155

(2) INFORMATION FOR SEQ ID NO:8:

- 55 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 158 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear

60 (ii) MOLECULE TYPE: peptide

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Asp Asn Phe Gly Arg Leu His Cys Thr Thr Ala Val Ile Arg Asn Ile
1 5 10 15

10

Asn Asp Gln Val Leu Phe Val Asp Lys Arg Gln Pro Val Phe Glu Asp
20 25 30

15

Met Thr Asp Ile Asp Gln Ser Ala Ser Glu Pro Gln Thr Arg Leu Ile
35 40 45

Ile Tyr Met Tyr Lys Asp Ser Glu Val Arg Gly Leu Ala Val Thr Leu
50 55 60

20

Ser Val Lys Asp Ser Lys Met Ser Thr Leu Ser Cys Lys Asn Lys Ile
65 70 75 80

Ile Ser Phe Glu Glu Met Asp Pro Pro Glu Asn Ile Asp Asp Ile Gln
85 90 95

25

Ser Asp Leu Ile Phe Phe Gln Lys Arg Val Pro Gly His Asn Lys Met
100 105 110

Glu Phe Glu Ser Ser Leu Tyr Glu Gly His Phe Leu Ala Cys Gln Lys
115 120 125

30

Glu Asp Asp Ala Phe Lys Leu Ile Leu Lys Lys Asp Glu Asn Gly
130 135 140

35

Asp Lys Ser Val Met Phe Thr Leu Thr Asn Leu His Gln Ser
145 150 155

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

40

- (A) LENGTH: 154 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

45

(ii) MOLECULE TYPE: peptide

50

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Asp Ala Pro Val Arg Ser Leu Asn Cys Thr Leu Arg Asp Ser Gln Gln
1 5 10 15

55

Lys Ser Leu Val Met Ser Gly Pro Tyr Glu Leu Lys Ala Leu His Leu
20 25 30

Gln Gly Gln Asp Met Glu Gln Gln Val Val Phe Ser Met Ser Phe Val
35 40 45

60

TIMANS

111.

DX0904K

Gln Gly Glu Glu Ser Asn Asp Lys Ile Pro Val Ala Leu Gly Leu Lys
50 55 60

5 Glu Lys Asn Leu Tyr Leu Ser Cys Val Leu Lys Asp Asp Lys Pro Thr
65 70 75 80

Leu Gln Leu Glu Ser Val Asp Pro Lys Asn Tyr Pro Lys Lys Met
85 90 95

10 Glu Lys Arg Phe Val Phe Asn Lys Ile Glu Ile Asn Asn Lys Leu Glu
100 105 110

Phe Glu Ser Ala Gln Phe Pro Asn Trp Tyr Ile Ser Thr Ser Gln Ala
115 120 125

15 Glu Asn Met Pro Val Phe Leu Gly Gly Thr Lys Gly Gly Gln Asp Ile
130 135 140

20 Thr Asp Phe Thr Met Gln Phe Val Ser Ser
145 150

(2) INFORMATION FOR SEQ ID NO:10:

- 25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 153 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear
- 30 (ii) MOLECULE TYPE: peptide

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Asp Val Pro Ile Arg Gln Leu His Tyr Arg Leu Arg Asp Glu Gln Gln
1 5 10 15

40 Lys Ser Leu Val Leu Ser Asp Pro Tyr Glu Leu Lys Ala Leu His Leu
20 25 30

Asn Gly Gln Asn Ile Asn Gln Gln Val Ile Phe Ser Met Ser Phe Val
35 40 45

45 Gln Gly Glu Pro Ser Asn Asp Lys Ile Pro Val Ala Leu Gly Leu Lys
50 55 60

Gly Lys Asn Leu Tyr Leu Ser Cys Val Met Lys Asp Gly Thr Pro Thr
50 65 70 75 80

55 Leu Gln Leu Glu Ser Val Asp Pro Lys Gln Tyr Pro Lys Lys Met
85 90 95

60 Glu Lys Arg Phe Val Phe Asn Lys Ile Glu Val Lys Ser Lys Val Glu
100 105 110

Phe Glu Ser Ala Glu Phe Pro Asn Trp Tyr Ile Ser Thr Ser Gln Ala
115 120 125

Glu His Lys Pro Val Phe Leu Gly Asn Asn Ser Gly Gln Asp Ile Ile
130 135 140

5 Asp Phe Thr Met Glu Ser Val Ser Ser
145 150

(2) INFORMATION FOR SEQ ID NO:11:

- 10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 153 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear.

15 (ii) MOLECULE TYPE: peptide

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Cys Arg Pro Ser Gly Arg Lys Ser Ser Lys Met Gln Ala Phe Arg Ile
1 5 10 15

25 Trp Asp Val Asn Gln Lys Thr Phe Tyr Leu Arg Asn Asn Gln Leu Val
20 25 30

30 Ala Gly Tyr Leu Gln Gly Pro Asn Val Asn Leu Glu Glu Lys Ile Asp
35 40 45

Val Val Pro Ile Glu Pro His Ala Leu Phe Leu Gly Ile His Gly Gly
50 55 60

35 Lys Leu Cys Leu Ser Cys Val Lys Ser Gly Asp Glu Thr Arg Leu Gln
65 70 75 80

Leu Glu Ala Val Asn Ile Thr Asp Leu Ser Glu Asn Arg Lys Gln Asp
85 90 95

40 Lys Arg Phe Ala Phe Ile Arg Ser Asp Ser Gly Pro Thr Thr Ser Phe
100 105 110

45 Glu Ser Ala Ala Cys Pro Gly Trp Phe Leu Cys Thr Ala Met Glu Ala
115 120 125

Asp Gln Pro Val Ser Leu Thr Asn Met Pro Asp Glu Gly Val Met Val
130 135 140

50 Thr Lys Phe Tyr Phe Gln Glu Asp Glu
145 150

(2) INFORMATION FOR SEQ ID NO:12:

- 55 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 153 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear

60 (ii) MOLECULE TYPE: peptide

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Cys Arg Pro Ser Gly Lys Arg Pro Cys Lys Met Gln Ala Phe Arg Ile
1 5 10 15

10 Trp Asp Thr Asn Gln Lys Thr Phe Tyr Leu Arg Asn Asn Gln Leu Ile
20 25 30

Ala Gly Tyr Leu Gln Gly Pro Asn Ile Lys Leu Glu Glu Lys Ile Asp
15 35 40 45

Met Val Pro Ile Asp Leu His Ser Val Phe Leu Gly Ile Lys Gly Tyr
50 55 60

Lys Leu Tyr Met Ser Cys Val Lys Ser Gly Asp Asp Ile Lys Leu Gln
20 65 70 75 80

Leu Glu Glu Val Asn Ile Thr Asp Leu Ser Lys Asn Lys Glu Glu Asp
85 90 95

25 Lys Arg Phe Thr Phe Ile Arg Ser Glu Lys Gly Pro Thr Thr Ser Phe
100 105 110

Glu Ser Ala Ala Cys Pro Gly Trp Phe Leu Cys Thr Thr Leu Glu Ala
30 115 120 125

Asp Arg Pro Val Ser Leu Thr Asn Thr Pro Glu Glu Pro Leu Ile Val
130 135 140

35 Thr Lys Phe Tyr Phe Gln Glu Asp Gln
145 150

(2) INFORMATION FOR SEQ ID NO:13:

- 40 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 156 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear
- 45 (ii) MOLECULE TYPE: peptide

50 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Met Met Val Leu Ser Gly Ala Leu Cys Phe Arg Met Lys Asp Ser Ala
1 5 10 15

55 Leu Lys Val Leu Tyr Leu His Asn Asn Gln Leu Leu Ala Gly Gly Leu
20 25 30

His Ala Glu Lys Val Ile Lys Gly Glu Glu Ile Ser Val Val Pro Asn
35 40 45

60

| | |
|----|---|
| | Arg Ala Leu Asp Ala Ser Leu Ser Pro Val Ile Leu Gly Val Gln Gly |
| | 50 55 60 |
| 5 | Gly Ser Gln Cys Leu Ser Cys Gly Thr Glu Lys Gly Pro Ile Leu Lys |
| | 65 70 75 80 |
| | Leu Glu Pro Val Asn Ile Met Glu Leu Tyr Leu Gly Ala Lys Glu Ser |
| | 85 90 95 |
| 10 | Lys Ser Phe Thr Phe Tyr Arg Arg Asp Met Gly Leu Thr Ser Ser Phe |
| | 100 105 110 |
| | Glu Ser Ala Ala Tyr Pro Gly Trp Phe Leu Cys Thr Ser Pro Glu Ala |
| | 115 120 125 |
| 15 | Asp Gln Pro Val Arg Leu Thr Gln Ile Pro Glu Asp Pro Ala Trp Asp |
| | 130 135 140 |
| | Ala Pro Ile Thr Asp Phe Tyr Phe Gln Gln Cys Asp |
| 20 | 145 150 155 |

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
- | | |
|----|--------------------------------|
| 25 | (A) LENGTH: 160 amino acids |
| | (B) TYPE: amino acid |
| | (C) STRANDEDNESS: not relevant |
| | (D) TOPOLOGY: linear |
| 30 | (ii) MOLECULE TYPE: peptide |

| | |
|----|---|
| 35 | (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14: |
| | Met Asn Lys Glu Lys Glu Leu Arg Ala Ala Ser Pro Ser Leu Arg His |
| | 1 5 10 15 |
| 40 | Val Gln Asp Leu Ser Ser Arg Val Trp Ile Leu Gln Asn Asn Ile Leu |
| | 20 25 30 |
| | Thr Ala Val Pro Arg Lys Glu Gln Thr Val Pro Val Thr Ile Thr Leu |
| | 35 40 45 |
| 45 | Leu Pro Cys Gln Tyr Leu Asp Thr Leu Glu Thr Asn Arg Gly Asp Pro |
| | 50 55 60 |
| 50 | Thr Tyr Met Gly Val Gln Arg Pro Met Ser Cys Leu Phe Cys Thr Lys |
| | 65 70 75 80 |
| | Asp Gly Glu Gln Pro Val Leu Gln Leu Gly Glu Gly Asn Ile Met Glu |
| | 85 90 95 |
| 55 | Met Tyr Asn Lys Lys Glu Pro Val Lys Ala Ser Leu Phe Tyr His Lys |
| | 100 105 110 |
| | Lys Ser Gly Thr Thr Ser Thr Phe Glu Ser Ala Ala Phe Pro Gly Trp |
| | 115 120 125 |

Phe Ile Ala Val Cys Ser Lys Gly Ser Cys Pro Leu Ile Leu Thr Gln
130 135 140

5 Glu Leu Gly Glu Ile Phe Ile Thr Asp Phe Glu Met Ile Val Val His
145 150 155 160

(2) INFORMATION FOR SEQ ID NO:15:

- 10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 169 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: not relevant
(D) TOPOLOGY: linear
15 (ii) MOLECULE TYPE: peptide

- 20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Met Arg Gly Thr Pro Gly Asp Ala Asp Gly Gly Arg Ala Val Tyr
1 5 10 15

25 Gln Ser Met Cys Lys Pro Ile Thr Gly Thr Ile Asn Asp Leu Asn Gln
20 25 30

30 Gln Val Trp Thr Leu Gln Gly Gln Asn Leu Val Ala Val Pro Arg Ser
35 40 45

Asp Ser Val Thr Pro Val Thr Val Ala Val Ile Thr Cys Lys Tyr Pro
50 55 60

35 Glu Ala Leu Glu Gln Gly Arg Gly Asp Pro Ile Tyr Leu Gly Ile Gln
65 70 75 80

Asn Pro Glu Met Cys Leu Tyr Cys Glu Lys Val Gly Glu Gln Pro Thr
85 90 95

40 Leu Gln Leu Lys Glu Gln Lys Ile Met Asp Leu Tyr Gly Gln Pro Glu
100 105 110

45 Pro Val Lys Pro Phe Leu Phe Tyr Arg Ala Lys Thr Gly Arg Thr Ser
115 120 125

Thr Leu Glu Ser Val Ala Phe Pro Asp Trp Phe Ile Ala Ser Ser Lys
130 135 140

50 Arg Asp Gln Pro Ile Ile Leu Thr Ser Glu Leu Gly Lys Ser Tyr Asn
145 150 155 160

55 Thr Ala Phe Glu Leu Asn Ile Asn Asp
165